IN THE CLAIMS:

37. (Twice Amended) A method for determining the time course of a reaction in which at least one reactant is converted to one or more products, said method comprising:

(a) forming a composition containing said reactant and a luminophore, wherein

(i) the reactant reacts to form a reaction product;

(ii) the luminophore is capable of being induced to emit an electrochemiluminescence signal, wherein electrochemiluminescence emitted by said luminophore is affected by said reaction; and

(iii) the electrochemiluminescence signal emitted upon exposure of said composition to electrical energy changes as the reaction progresses;

(b) exposing the composition to electrical energy at selected time intervals and measuring the electrochemiluminescence signal during said selected time intervals to determine the time course of the reaction; and

(c) calculating the time course of the reaction from the ECL signals measured in step (b).

38. (Amended) The method of claim 37, wherein the reaction is a biomolecular reaction of the reactant with a reaction partner.

39. The method of claim 37, wherein the reaction is a binding reaction of the reactant with the reaction partner.

40. The method of claim 37, wherein the reaction is an enzyme catalyzed reaction.

41. (Twice Amended) The method of claim 37, wherein the reactant reacts with the luminophore.

42. (Twice Amended) The method of claim 37, wherein the reaction product reacts with the luminophore.

43. The method of claim 37, wherein the reactant is a cofactor.

44. The method of claim 43, wherein the cofactor is NADH.

45. The method of claim 37, wherein the reaction product is a cofactor.

46. The method of claim 45, wherein the cofactor is NADH.

47. The method of claim 37, wherein the luminophore comprises an organic luminophore.

48. The method of claim 37, wherein the luminophore comprises an organometallic luminophore.

49. The method of claim 39, wherein the reactant is an antibody and the reaction partner is an antigen.

50. The method of claim 39, wherein the reactant is attached to the luminophore and the reaction partner is attached to a magnetic bead.

51. The method of claim 37, wherein step (b) comprises exposing the composition to a series of electrical energy pulses.

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53. (Amended) The method of claim 37, wherein step (b) comprises exposing the composition to a series of electrical pulses at a preselected potential and at preselected intervals of time and duration.

54. The method of claim 37, further comprising the step of determining the concentration of the reactant in a sample.

55. The method of claim 37, wherein the luminophore is selected from the group consisting of Ru-containing and Os-containing compounds.

56. The method of claim 37, wherein the luminophore is ruthenium tris-bypyridine or osmium tris-bipyridine.

57. (Twice Amended) A method for determining the time course of a binding reaction comprising:

(a) forming a composition containing a reactant, a reaction partner and a luminophore, wherein

(i) the reactant and the reaction partner bind to form a complex;

(ii) the luminophore is capable of being induced to emit an electrochemiluminescence signal; and

(iii) the luminophore is attached to said reaction partner; and

(b) exposing the composition to electrical energy at selected time intervals and measuring the electrochemiluminescence signal at said time intervals to determine the time course of the binding reaction.

58. The method of claim 57, wherein the luminophore comprises an organometallic luminophore.

59. The method of claim 57, wherein the reaction partner is an antibody and the reactant is an antigen.

60. The method of claim 57, wherein the reaction partner is attached to the luminophore via a covalent bond.

61. The method of claim 57, wherein the reaction partner is attached to the luminophore via a biotin-streptavidin binding interaction.

62. (Twice Amended) A method for determining the time course of an enzymatic reaction comprising:

(a) forming a composition containing an enzyme, an enzyme substrate and a luminophore, wherein

(i) the enzyme catalyzes the reaction of the substrate to form a reaction product;

(ii) the luminophore is capable of being induced to emit an electrochemiluminescence signal and said electrochemiluminescence signal emitted from said luminophore varies with the concentration of said substrate or said reaction product; and

(iii) the intensity of the electrochemiluminescence signal emitted upon exposure of said composition to electrical energy changes as said reaction progresses; and

(b) exposing the composition to electrical energy at selected time intervals and measuring the electrochemiluminescence signal at said selected intervals to determine the time course of the reaction.

63. (Amended) The method of claim 62, wherein the enzyme substrate is a cofactor.

64. The method of claim 63, wherein the cofactor is NADH.

65. (Amended) The method of claim 62, wherein the reaction product is a cofactor.

66. The method of claim 65, wherein the cofactor is NADH.

67. The method of claim 62, wherein the luminophore comprises an organometallic luminophore.

68. (Twice Amended) A method for determining the time course of a reaction comprising:

(a) forming a composition containing a luminophore, a reactant, and a reaction partner of the reactant, wherein the reactant reacts with the reaction partner to form a reaction product; and

(b) exposing the composition to electrical energy at selected time intervals and measuring the electrochemiluminescence signal at said selected time intervals to determine the time course of the reaction, wherein the intensity of the electrochemiluminescence signal relates to the concentration of said reactant, said reaction partner of said reactant or said reaction product.

69. (Amended) The method of claim 68, wherein the reaction product is a cofactor.

70. (Amended) The method of claim 69, wherein said luminophore reacts with the reactant, the reaction partner, or the reaction product, to emit an electrochemiluminescence signal upon exposure to electrical energy.

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71. The method of claim 57, wherein said luminophore reacts with the reactant, the reaction partner or the reaction product to emit electrochemiluminescence upon exposure to said electrical energy.

72. The method of claim 37, further comprising normalizing said electrochemiluminescence signal.

73. The method of claim 37, further comprising normalizing said electrochemiluminescence signal using a second reaction mixture containing said reactant and said luminophore and wherein said second reaction mixture is allowed to react to completion prior to exposing said second reaction mixture to electrical energy and measuring said emitted electrochemiluminescence signal thereby determining said time course of reaction.

74. The method of claim 38, further comprising normalizing said electrochemiluminescence signal using a blank reactant mixture containing said reactant and said luminophore and not said reaction partner and exposing said blank reactant mixture to electrical energy and measuring emitted electrochemiluminescence signal thereby determining said time course of reaction.

75. The method of claim 74, further comprising normalizing said electrochemiluminescence signal using a second reaction mixture containing said reactant and said luminophore and wherein said second reaction mixture is allowed to react to completion prior to exposing said second reaction mixture to electrical energy and measuring said emitted electrochemiluminescence signal thereby determining said time course of reaction.

The following are new claims:

76. A method for determining the time course of a reaction in a composition containing a luminophore wherein said composition is exposed to electrical energy at selected time intervals during said reaction to induce said luminophore to emit an electrochemiluminescent signal and said electrochemiluminescent signal is measured during said selected time intervals to determine said time course of reaction.

77. The method of claim 76, wherein the reaction is a biomolecular reaction of a reactant with a reaction partner.

78. The method of claim 76, wherein the reaction is a specific binding reaction of a reactant with the reaction partner.

79. The method of claim 76, wherein the reaction is an enzyme catalyzed reaction.

80. The method of claim 76, wherein the reaction is of a reactant to form a reaction product and the concentration of said reactant affects said electrochemiluminescent process.

81. The method of claim 76, wherein the reaction is a reaction of a reactant to form a reaction product and the concentration of said reaction product affects said electrochemiluminescent process.

82. The method of claim 76, wherein the reaction is a reaction of a reactant to form a reaction product and said reactant reacts with said luminophore in the electrochemiluminescence process.

83. The method of claim 76, wherein the reaction is a reaction of a reactant to form a reaction product and said reaction product reacts with said luminophore in the electrochemiluminescence process.

84. The method of claim 76, wherein the reaction is a reaction of a reactant with a reaction partner to form a reaction product and the reactant is an antibody and the reaction partner is an antigen.

85. The method of claim 76, wherein the reaction is a reaction of a reactant with a reaction partner to form a reaction product and the reactant is attached to the luminophore and the reaction partner is attached to a magnetic bead.

86. The method of claim 76, wherein the reaction is a reaction of a reactant to form a reaction product and the reactant is a cofactor.

87. The method of claim 86, wherein the cofactor is NADH.

88. The method of claim 76, wherein the reaction is a reaction of a reactant to form a reaction product and the reaction product is a cofactor.

89. The method of claim 88, wherein the cofactor is NADH.

90. The method of claim 76, wherein the luminophore comprises an organic luminophore.

91. The method of claim 76, wherein the luminophore comprises an organometallic luminophore.

92. The method of claim 76, wherein the luminophore is selected from the group consisting of Ru-containing and Os-containing compounds.

93. The method of claim 76, wherein the luminophore is ruthenium tris-bypyridine or osmium tris-bipyridine.

Respectfully submitted,

KRAMER LEVIN NAFTALIS & FRANKEL LLP
Attorneys for Applicants

By: _____
Barry Evans
Reg. No. 22,802
(212) 715-7609